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U. S. DEPARTMENT OF AGRICULTURE.

REPORT

OF THE

CHIEF OF THE BIOLOGICAL SURVEY

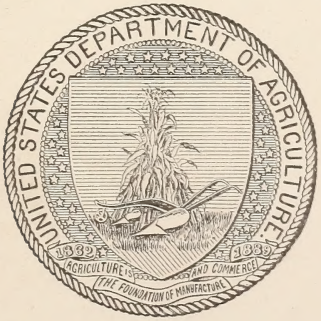
FOR

1902.

BY

C. HART MERRIAM.

[From Annual Reports, Department of Agriculture.]



WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1902.

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REPORT OF THE CHIEF OF THE DIVISION OF BIOLOGICAL SURVEY.

U. S. Department of Agriculture,
Division of Biological Survey,
Washington, D. C., October 9, 1902.

Sir: I have the honor to submit herewith a report of the work of the Biological Survey for the fiscal year ending June 30, 1902, with outline of work for 1903, and recommendations for 1904.

Respectfully,

C. Hart Merriam, *Chief.*

Hon. James Wilson, *Secretary.*

WORK OF THE YEAR.

As heretofore, the work of the Division has been conducted along three lines: (1) Investigations relating to the geographic distribution of animals and plants, including biological surveys and the determination of the life and crop belts, in charge of the chief; (2) investigations of the economic relations of birds to agriculture, in charge of Prof. F. E. L. Beal; (3) supervision of matters relating to game preservation and protection and the importation of foreign birds and animals, in charge of Dr. T. S. Palmer.

FIELD WORK.

Field work in studying the geographic distribution of mammals, birds, and plants, and in investigating the depredations of prairie dogs, has been carried on over wide areas in California, Texas, Kansas, Nebraska, the Dakotas, Montana, New Mexico, and Indian Territory. Extensive work also was done in Mexico and in the Canadian provinces of Alberta, Athabasca, and Mackenzie.

California has unusual claims on the Biological Survey. The diversity and commercial value of its agricultural products—its preeminence as a fruit-growing State, the extent of its grain fields, sugar-beet lands, and stock ranges—demand the early completion of maps showing the courses of the life zones and crop belts within its borders. But the preparation of these maps is unusually difficult on account of the extraordinary diversity of the physical and climatic conditions. Not only are there torrid valleys below the level of the sea, and alpine summits towering to elevations of more than 14,000 feet, but there are also areas of excessive humidity—of frequent fogs and heavy rainfall—and areas of excessive aridity—hotter and drier than the Sahara, where perpetual sunshine is the rule and years sometimes pass without rain. The labor of tracing the boundaries of the life

zones, therefore, is one of great detail, and is made still more difficult by the absence of accurate topographic base maps, except of the areas already mapped by the United States Geological Survey. For some years the Biological Survey has been at work in California, doing as much each year as its limited means have permitted. During the past season sections were studied on both slopes of the Sierra Nevada—from Mono Lake to Owens Valley on the east, and from Kaweah River to the Tuolumne on the west—and in Riverside and San Diego counties, by parties in charge of the chief of the Division. The field parties in Texas, in charge of Vernon Bailey, chief field naturalist, visited, among other localities, the Chisos, Davis, and Guadalupe mountains, the forested swamps of Sabine River, and the open Staked Plains. The work in the Guadalupe Mountains was extended into New Mexico, where parts of the Pecos Valley and Sacramento Mountains were studied. As in previous years, the field work in Mexico was in charge of E. W. Nelson, and investigations were carried on in the States of Tamaulipas, Nuevo Leon, and Coahuila, where much valuable material was collected. The exploration of the Great Slave Lake region in Canada, which was barely commenced in the latter part of the last fiscal year, was carried to a successful termination by Edward A. Preble. Much important information was obtained and extensive collections were secured. As on his previous trip to Hudson Bay, Mr. Preble was heartily welcomed and given substantial assistance by the officers of the Hudson Bay Company. Without this cordial cooperation the expedition might easily have failed.

In the Great Plains region prairie dogs have greatly increased, owing to the extension of ranching and the destruction of their natural enemies. Their depredations are widespread, and complaints and requests for assistance have come to the Department from hundreds of localities. In order to obtain accurate information, an assistant, Wilfred H. Osgood, was sent to Kansas, Nebraska, North Dakota, South Dakota, and Montana to examine the conditions and to experiment with bisulphide of carbon and other poisons with a view to finding some cheap as well as effective remedy against this pest. Similar investigations were carried on in Texas by Vernon Bailey and H. C. Oberholser, but lack of funds prevented field experiments in poisoning in winter and early spring, when poisons are most freely taken. The present status of the subject is summarized in a paper by the chief of the Division on "The prairie dog of the Great Plains," in the Yearbook of the Department for 1901.

ECONOMIC ORNITHOLOGY.

The work of the economic section during the fiscal year ending June 30, 1902, as in previous years, has consisted of two distinct parts—laboratory work and field work. Laboratory work consists in the examination of stomachs and crops of birds and the tabulation of results. Field work consists in observing the food habits of birds in the field to learn as fully as possible upon what certain species feed, where they feed, and when they feed, and also what foods are most abundant and most easily procured; in other words, to observe every circumstance connected with the food habits, so as to ascertain if possible whether apparently favored food is eaten through preference or necessity. During the year there have been received from miscellaneous collectors 3,972 stomachs of birds. In addition to these, Prof. S. A. Forbes, of Champaign, Ill., has presented to the Biological

Survey his collection of a little more than 5,000 stomachs. Thus, about 9,000 stomachs have been added to those now in stock, making the total number on hand a little more than 45,000.

During the year there have been examined 2,234 stomachs, distributed among various groups as follows:

Ducks	31	Fringillidæ	546
Woodcock	20	Shrikes	43
Gallinæ	966	Wrens	44
Woodpeckers	41	Titmice	27
Flycatchers	155	Thrushes	97
Jays	144	Miscellaneous	55
Horned larks	21		
Icteridæ	44	Total	2,234

A bulletin on the food of the sparrows, by Sylvester Dwight Judd, has been published. Its preparation occupied three years, and involved the examination and tabulation of more than 4,000 stomachs, besides a large amount of field work. It is believed that the results are of interest and value to farmers throughout the land. For several years Dr. Judd has also been studying the birds on a Maryland farm, which he has visited for this purpose at frequent intervals and at all seasons. The farm selected is one yielding a diversity of crops, and is believed to be as nearly typical as could be found within convenient distance from Washington. In pursuance of this work, Dr. Judd has carefully studied the food of every species of bird on the place, as well as could be determined by field observation, and at the same time has noted the quantity and character of the visible supply of bird food. He has observed the birds not only at all seasons of the year, but at all hours of the day and in all conditions of weather and temperature, and has also taken specimens at various times in order to examine the contents of their stomachs. The object in view has been to find out the relations and interactions of birds and insects upon farm crops; to ascertain if any direct checks upon the ravages of insects through the actions of birds are noticeable, and to judge as nearly as may be what damage is done to crops by birds themselves, and to what extent this damage is offset by useful services rendered.

For many years the fruit growers of California have been complaining of the destruction of fruit by birds. In order to gain definite knowledge upon this subject, Prof. F. E. L. Beal visited California in May, 1901, and remained there nearly four months studying the conditions that prevail in the great fruit-growing sections. During this time he visited some of the principal fruit-raising centers and studied the habits of birds in the orchards when the fruit crop was at its best. Incidentally, he traveled nearly 3,000 miles within the limits of the State, and interviewed many of the principal fruit growers, who courteously extended every facility for his investigations. He collected more than a thousand stomachs of birds, mostly taken in orchards when the fruit was ripe, and also such of the common insects, seeds, and wild fruits as were deemed likely to serve as food for birds. Since his return the stomachs have been examined, together with others previously received from collectors in California.

In view of the great interest now taken in game protection, a study of the food habits of game birds is of pressing need. It is desirable to ascertain the true economic position of the different members of this group in order to determine to what extent their preservation is demanded by reasons other than those founded upon their value as

food or the desire to kill them for sport. Accordingly, during the past year, Dr. Judd has been pursuing such investigation. He has now in view a bulletin on the food of the Gallinæ, and will include with these the woodcock as a bird of special interest from the fact that owing to the high esteem in which it is held as an article of food, and the lack of adequate laws for its protection, it is fast vanishing from the earth. This work is well advanced and may be expected at an early date. Bulletins on the food of waterfowl and shore birds are in contemplation, and some work has already been done in these groups.

PROTECTION OF BIRDS AND GAME.

During the year work under the Lacey Act has been continued along three main lines—(1) publication of information on game protection; (2) improvement of the inspection service connected with importation of foreign birds and animals; and (3) cooperative work in restricting interstate shipment of game contrary to law.

PUBLICATIONS.

The compilations and synopses of game laws issued from time to time have been distributed widely, and are in constant demand. With a view to making the ever-changing provisions of the State laws better known, a digest of the game laws for 1901 and two posters showing close seasons in the United States and Canada were distributed in September, about the beginning of the hunting season. A revised edition of the laws protecting nongame birds was published later. Circulars were also issued containing the game laws of the District of Columbia, regulations for importation of reptiles into Hawaii, and for the introduction of the eggs of game birds into the United States. The annual directory of State officials and organizations concerned with game protection was prepared for the Yearbook of the Department and afterwards issued separately. Finally, a popular account of the woodcock and wood duck, by Dr. A. K. Fisher, the first of a series of special papers on game birds, was also published in the Yearbook.

IMPORTATION OF FOREIGN SPECIES.

During the year 287 permits were issued for the entry of about 200 mammals and 50,000 birds, an increase of 101 permits and 43,000 birds, and a decrease of 150 mammals, compared with the transactions in 1901. The figures are, however, subject to revision, as the number of birds actually imported is often less than that called for in the permit. There has been a decided increase in the number of birds entered at New York, while the number imported at San Francisco has decreased, particularly in the case of Australian species. This decrease is attributed to the long-continued drought in Australia and the consequent difficulty in securing birds there. Among the most noteworthy mammals imported may be mentioned a musk ox captured near the mouth of the Mackenzie River and entered at San Francisco. This specimen, the first musk ox in captivity in the United States, is now in the collection of the New York Zoological Society. A number of North African ostriches, the first of this species of ostriches to be brought in for propagation, were imported for the ostrich farm at Pasadena, Calif.

Importations may be divided into two general groups—game birds

imported for propagation in captivity, and birds brought in to supply the trade in cage birds. Of these two classes, the latter greatly exceeds the former in numbers. The consignments of cage birds are often of considerable size, and to prevent any injurious species from entering unnoticed amid a large number of harmless ones, arrangements were made through the Secretary of the Treasury, in July, 1901, whereby all big consignments of cage birds arriving at New York, the main port of entry for birds, were subjected to examination by the inspectors of this Department. Approximately, 200,000 birds, including about 180,000 canaries, were entered at New York, most of which were inspected. The new duties thus created necessitated the appointment of an additional inspector at New York, making three in all now on duty at that port.

On January 1, 1902, the inspection service was extended to the Territory of Hawaii and a special inspector appointed for Honolulu. Owing to absence of cable communication with the islands this inspector has been authorized to issue permits subject to general instructions from the Department. In May, at the earnest request of the Chamber of Commerce in Honolulu and of some of the sugar planters of Hawaii, an order was issued requiring permits for all reptiles imported into the Territory and prohibiting the entry of poisonous species.

Twelve foreign species of mammals and birds are now known to be acclimated in Hawaii, four of which—the mongoose, the English sparrow, the mina, and the Java ricebird (*Munia nisoria*)—are injurious. In Porto Rico the mongoose is acclimated and also two species of African weaver birds, whose exact economic status is not yet known. A few specimens of the mongoose are still in captivity in the United States, but these are, as a rule, in public zoological gardens where their safe-keeping is assured.

So far as known, no prohibited species have been brought into the United States during the year. Entry has been refused in the case of one mongoose at San Francisco and two fruit-eating bats and one kohlmeise at New York. The principal importers of foreign birds and animals have shown no disposition to attempt the importation of prohibited species and have uniformly complied with the requirements of the law.

By an act of Congress approved June 3, 1902, the prohibition against the entry of eggs of game birds which has existed since 1894 has been removed, and these eggs can now be imported, under regulations of this Department, for propagation. The regulations necessary to carry out the law were promptly promulgated, and within a few weeks after the bill was signed the first importation of eggs arrived at New York.

INTERSTATE COMMERCE IN GAME.

The provisions of the law regarding interstate commerce in game have necessarily been carried out very largely through cooperation with State officers. Special mention should be made of the services rendered in this connection by the State game commissioner of Illinois and the State game wardens of Iowa, Michigan, and West Virginia. Through the cordial cooperation of the Attorney-General, the cases referred for action to the Department of Justice have been taken up as promptly as possible and many of them prosecuted to a successful termination. During the year 39 cases, involving the illegal shipment of about 5,000 birds, were reported to this Department, as against 57

cases, involving the shipment of about 16,000 birds, during the preceding year. This decrease in number of cases does not necessarily imply a more careful observance of the law, for it is probable that only a comparatively small number of violations are brought to the surface. The proportion of convictions, however, will probably be larger, for the cases of this year have been supported by much better evidence than those of 1901, and their prosecution is likely to prove much more effective. Of the cases arising this year, only two have been dropped for lack of sufficient evidence, and one is still awaiting action; the others have been referred, 23 to the Department of Justice and 13 to State officers. Four of the State cases have already resulted in conviction. Since the passage of the act 24 convictions have already been secured in cases passing through this Department—14 in the Federal courts and 10 in the State courts; and 30 or more cases are still pending in the Federal courts.

BIRD MIGRATION.

Prof. W. W. Cooke, author of "Bird migration in the Mississippi Valley" (Bulletin No. 2 of this Division, 1886), has been temporarily employed to arrange the material that has accumulated since the publication of the former bulletin. In working out the winter ranges and migration routes it was found that the number of observers in the South Atlantic and Gulf States was insufficient to supply the needed data. Consequently, a large amount of preliminary work had to be done, and at the very beginning an attempt to increase the number of observers in these sections was undertaken. With this object in view about 800 letters were written, resulting in promises of aid and cooperation from over 200 persons, and the actual receipt of nearly six times as many reports as came from these sections in 1901. A bibliography of migration has been undertaken, and is now practically complete, for the years 1845–1901, so far as regards United States species that occur at any time south of our boundary.

In preparing the results for publication it has been deemed advisable to take up the several groups separately, and the large family of warblers has been selected as the first group to be considered. A bulletin is now nearly ready for the press in which are shown the winter and summer distribution of warblers, the routes traveled by them in passing to and fro, the times of arrival and departure at different points included in their journeys, and various other details connected with their migrations. The distribution and migration of 72 other species, which with the warblers cover the remaining species of land birds east of the Rocky Mountains that regularly migrate to points south of the United States, have also been partially determined; reports on these are expected to follow.

PUBLICATIONS.

The publications issued during the year included two numbers of North American Fauna (Nos. 20 and 21), two bulletins (15 and 16), two articles in the Yearbook for 1901, four circulars (34–37, inclusive), the report of the Division for 1901, a revised edition of Bulletin No. 12, and six reprints of former publications. The two numbers of North American Fauna were No. 20, "Revision of the skunks of the genus *Chincha*," by Arthur H. Howell, and No. 21 (a double number) the "Natural history of the Queen Charlotte Islands, British Colum-

bia" and the "Natural history of the Cook Inlet Region, Alaska," both by Wilfred H. Osgood. Bulletin No. 15, "The relation of sparrows to agriculture," by Sylvester D. Judd, embodies the results of long-continued observation and study of the native sparrows, the progress of which has been noted in previous reports. Bulletin No. 16, "Digest of game laws for 1901," by T. S. Palmer and H. W. Olds, is a compilation of laws relating to game protection similar to Bulletin No. 14 published last year, but somewhat broader in scope than that publication. The Yearbook articles are "The prairie dog of the Great Plains region," by C. Hart Merriam, and "Two vanishing game birds" (the woodcock and the wood duck), by A. K. Fisher. The circulars were as follows: No. 34, "Laws for the protection of birds and game in the District of Columbia;" No. 35, "Directory of State officials and organizations concerned with the protection of birds and game, 1902;" No. 36, "Importation of reptiles into Hawaii;" No. 37, "Regulations for the importation of eggs of game birds for propagation." Bulletin 12, a revised edition of which was published, was a treatise on "Legislation for the protection of birds," by T. S. Palmer. Three reprints were required of Farmers' Bulletin No. 54, "Some common birds in their relation to agriculture," by F. E. L. Beal, making a total of 265,000 copies issued since 1896, the date of the original publication. One reprint was necessary of each of the following publications: Bulletin 13, "Bobolinks, blackbirds, and grackles," by F. E. L. Beal; Circular 29, "Protection and importation of birds under act of Congress approved May 25, 1900," and Circular 32, "Directions for the destruction of prairie dogs" (revised edition).

ROUTINE WORK.

Routine work has increased with the growth of the Division, and demands a greater proportion of attention from the office force as time progresses. It consists of correspondence, preparation of reports and bulletins for publication, identification of specimens, care of collections, arrangement and tabulation of field reports, sorting and filing of published matter valuable for reference, attention to the needs of the field naturalists, issue of permits for the introduction of foreign mammals and birds, and cooperation in enforcing the various provisions of the act of Congress of May 25, 1900.

The letters received during the year numbered about 5,300. Many of these were accompanied by schedules or reports, and others contained notes of interest and value. During the same period 3,200 letters were written and 700 blank migration and other schedules were distributed to observers.

The large collection of photographic negatives made by members of the Biological Survey while in the field now numbers about 4,500, and is of constantly increasing value for purposes of study and illustration.

OUTLINE OF WORK FOR THE YEAR 1903.

FIELD WORK.

Field work for the current year in California will include a continuation of the biological survey of the Sierra Nevada, particularly of the western slopes and foothills, and a biological reconnoissance of the Santa Lucia Mountains and other coast ranges of the middle western part of the State. In Texas, work will be continued in

various places, connecting and completing work of previous years. Western Arizona also will be visited for the purpose of collecting material to complete former field work, and the explorations in Alaska, which were unavoidably interrupted last season, will be continued in the interior west of Cook Inlet and at the base of the Alaska Peninsula. If practicable, an extended reconnoissance along the lower Mackenzie River from Great Bear Lake to the Arctic will be undertaken in the spring for the purpose of determining the northern range and distribution of various boreal animals and plants, and to supplement the work already done in the Hudson Bay and Great Slave Lake regions. A report entitled "A biological investigation of the Hudson Bāy region" has gone to press, and will appear as North American Fauna No. 22.

ECONOMIC ORNITHOLOGY.

Another visit to California to study the food habits of birds is in contemplation for the coming year. Observations covering another fruit season, and also the late winter and spring months, when birds are reported to feed upon buds and blossoms, are necessary to complete those so well begun last year. No one season accurately represents the average conditions of climate, crops, insect enemies, and other contingencies which affect the general result in such an investigation, and no matter how closely the conditions may have been studied, the results of a single season's work would be too narrow a basis upon which to ground final conclusions. In some parts of this State the bee-keeping industry is of considerable financial importance. The bee keepers, like the fruit growers, have accused certain birds of doing harm to their business; in this case, however, by eating the stock itself—the bees. It is desirable that systematic observations be made on the ground by a competent observer, and stomachs collected, as was done in the case of the birds frequenting the fruit orchards. It is designed to embody the results of these investigations, when finished, in a bulletin on the economic relations of the birds of the Pacific coast.

For several years work has been in progress on the food habits of several other groups of birds, notably the flycatchers, thrushes, swallows, and titmice. As fast as stomachs of species belonging to any of these groups have been received, they have been examined and the results tabulated. When their number is sufficient to form a basis for safe conclusions, reports on the food will be published. Work on the flycatchers and thrushes is in an advanced stage of progress, and its completion may be looked for at an early date. Investigations of the food of several other groups are also being steadily carried forward, and will form the subjects of later publications. A new and revised edition of the woodpecker bulletin is in contemplation, as, since the publication of that work the number of additional stomachs received and examined is as large as the number forming the basis of the bulletin. A report of the investigation of birds on a Maryland farm is now in press, and will soon appear as Bulletin No. 17.

GAME PROTECTION AND IMPORTATION.

Plans for the year 1903 contemplate a broader and more effective enforcement of the provisions of the Lacey Act. The methods by which the various States secure protection for their birds and game

will be investigated, and a summary of the game laws will be widely distributed, to further prevent illegal shipments of game. Methods of shipping, and, if practicable, storage of game will be more fully investigated. Cold storage is one of the most important matters connected with game protection, for if the storage of some species continues unchecked it will neutralize the efforts for their protection. Inspection at the principal ports of entry now maintained by fees should be placed on a permanent basis, but this will require a special appropriation. By strict economy the present inspection could be maintained at three of the most important ports of entry for $1,000 per annum, a very small outlay in view of the protection afforded to the entire country by such service. More effective supervision will be made of the importation of foreign birds, particularly those brought in with passengers' baggage. Of the thousands of cage birds annually imported, some do not breed in captivity; others breed in captivity, but not at large; while others, if liberated under favorable conditions, may become acclimated and increase. The first two groups may be imported with impunity, the third only under careful restrictions. To determine more fully which species belong to the third group is the object of investigation to be begun at an early date. Upland game birds and certain kinds of big game may be increased directly by propagation or by restocking depleted covers. Without duplicating the work already done by private individuals and State commissions, several lines of experiment in this connection may be advantageously taken up under Federal auspices. During the past year the Department has received the offer of a small band of elk in the San Joaquin Valley, California, believed to be a different species from the elk of the north Pacific coast. They are the sole survivors of thousands which formerly inhabited the San Joaquin Valley, and provision should be promptly made for their preservation. Their acceptance has been prevented thus far by lack of funds for securing a proper range and transporting them to it. The game law recently enacted for Alaska imposes certain duties on the Secretary of Agriculture. If it is to be carried out under the supervision of this Department, provision should be made for the employment of several wardens and also of an inspector at Seattle, Wash., during the open season to enforce the provisions against shipment of game.

MIGRATION OF BIRDS.

During the current year the bulletin on the migration of North American warblers, prepared by Prof. W. W. Cooke, will be published and Professor Cooke will continue the preparation of reports on the remaining species of land birds inhabiting the region east of the Rocky Mountains. An attempt will be made to work out the evolution of migration routes in order to account for the distribution of North and South American species of certain families. Such parts of the records of migration for 1902 as relate to the species now being studied will be compared with those of previous years in order to add the new material they may contain.

With a view to the acquisition of information that will pave the way for better protection to our shore birds, preliminary work will be begun to determine the routes of migration and winter ranges of the various species. Shore birds, as a class, are noted for the great length of their migrations and for wide dispersal over their southern ranges.

RECOMMENDATIONS.

In submitting estimates for the fiscal year 1904 the following recommendations are respectfully made: (1) An increase in the salary roll of $3,400 to provide for the employment of two additional assistants (one to be a stenographer), at $1,000 each, and the transfer of one field naturalist at $1,400, now paid from the fund for biological investigations. (2) An increase in the appropriation for biological investigations of $10,000—$3,000 to extend field work in California and Texas, $5,000 to assist in carrying out the provisions of the Lacey Act, $1,000 for the preparation and elaboration of material for publication, and $1,000 for the collation of data and mapping the distribution of mammals and birds.